

Assessing Patients Adherence to Anti-Diabetic Medications in A Tertiary Hospital, Ghana.

(A cross-sectional study)

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Abstract:

Background: Medical adherence is an essential aspect or role played by the patients receiving prescribed treatment to control their medical conditions for their overall health benefit. Diabetes mellitus is a medical condition that has been estimated to rise from 135 to 300 million by 2025. This study sought to determine the level of adherence to antidiabetic medications among out-patients who visited the diabetic clinic in the teaching hospital.

Methodology: A quantitative cross-sectional study design and a random sampling procedure were used to collect data from patients at the diabetic clinic from 1st February 2022 to the end of April.2022 The study population consisted of all diagnosed diabetic patients attending the Diabetic Clinic of the Korle Bu Teaching Hospital. Two hundred five (205) patients with diabetes were identified as participants in this study. An Interviewer administered a modified semi-structured Morisky Scale questionnaire designed with REDCAP was used to collect data. and the data were organized using Excel software 2019 and analyzed using Statistical Package for Social Sciences (SPSS) version 26 results were presented with correlation statistics and Pearson's coefficients.

Findings: Two hundred and five (205) respondents participated in the study. The mean (SD) of respondents was 52.8 (\pm 11.9) adherence and gender, marital status, income earnings, religion, and employment status were weak positive correlations.

Conclusion: It was found that the level of antidiabetic medication adherence was 79.0%. The number of dependents, education level, income, and employment status were contributing factors affecting adherence.

Keywords: Patient's adherence, Diabetes, Medication Adherence

Introduction:

Diabetes Mellitus: Medication adherence is getting appreciation among clinicians as well as most healthcare systems, and governments. This may be due to the rising concerns resulting from the high prevalence of medication non-adherence which also resolves several medical complications and adverse outcomes. Medication non-adherence is also associated with medication costs [1]. According to the W.H.O, Diabetes is a chronic disease that occurs when enough hormone known as insulin cannot be produced by the pancreas or when the body cannot use this hormone effectively. This hormone's function is that it regulates blood sugar but when unregulated, raised blood sugar over time leads to serious damage to many of the body's systems. Furthermore, the World Health Organization (W.H.O) claims that diabetes can be treated as well as its medical issues or consequences avoided, it can also be delayed with lifestyle activity, proper dieting, medication, and regular screening and treatment for complications. [2]. It is the very essence that patients adhere to prescribed medication to enable the management of diabetes. World widely, among all age groups prevalence of diabetes has been estimated to be 2.8% in the year 2000 and extrapolated to be 4.4% by 2030 [3]. Research has found that 1 in 22 persons in the adult population in Africa is lined with diabetes [4]It is also claimed that in Ghana the prevalence including risk factors for diabetes differs with location [5]. According to the International Diabetes Federation, IDF, the statistics for Ghana look scary. It is projected that people living with diabetes would increase from 329,200 in the year 2021 to 483,900 by the year 2030 and 796,800 by 2045 [4] Diabetes health-related expenditure in Ghana is expected to rise from 92.0 million United States dollars in 2021 to 129.3 million dollars and finally to 209.0 million dollars by 2045. [6] This certainly calls for a concerted effort by all in combatting this debilitating condition

Methods: A quantitative cross-sectional study design and a random sampling procedure were used to collect data from patients at the diabetic clinic from 1st February 2022 to the end of April.2022 The study population consisted of all diagnosed diabetic patients attending the Diabetic Clinic of the Korle Bu Teaching Hospital. Two hundred five (205) patients with diabetes were identified in this study. An Interviewer administered a modified and validated semi-structured Morisky Scale questionnaire designed with REDCAP was used to collect data. and the data were organized using Excel software 2019 and analyzed using Statistical Package for Social Sciences (SPSS) version 21 results were presented with correlation statistics and Pearson's coefficients.

Inclusion criteria

1. Old or follow-up patients at the clinic
2. All gender who has the ability to speak
3. All age groups above 16yrs.
4. All nationalities visiting the clinic for treatment

Exclusion criteria

Exclusion criteria are those characteristics that disqualify prospective subjects from inclusion in the study. The criteria for exclusion in this study are;

1. New patients who have just visited the clinic
2. All who verbally affirmed the inability to speak
3. All who refuse to take part in the study or do not give consent.

Data collection: Data collection involved face-to-face interviews using a structured questionnaire to conduct it. The questionnaires from already validated sources were designed and tested before the survey began. The study was carried out with the aid of the designed questionnaires/ instrument adopted from sources of the validated instrument used to collect data from patients at the diabetic clinic from 1st February 2022 to the end of April 2022.

Statistical analysis: The data were presented as means and standard deviations for continuous variables (categorical/ordinal scales can be converted to ratio scale by assigning numerical to them) and Median and Interquartile Ranges for continuous variables that were not symmetrically distributed (thus were not normally distributed). Association/ Correlations were assessed using Pearson correlation for continuous variables and the Eta Coefficient test for associations between continuous dependent variables and categorical variables. Categorical variables were presented as frequencies and percentages. The independent variables were respondents' demographics e.g., age, marital status, economic status, number of dependents, income earnings, employment status, religion, and education level. Whereas the dependent or response variable was adherence to the medication (this was available both as a continuous and dichotomous variable). Multiple regression was run since the dependent variable was a continuous variable and a model was used to find an association between the independent variables and the dependable variable.

Ethical considerations: Ethics considerations

Ethics clearance was obtained from the Institution Review Board of the hospital

Demographic Data/Characteristics of Respondents

Two hundred and six respondents were questioned and the response was high (99.5%). Two hundred and five (205) respondents participated in the study. The mean age, as well as the standard deviation (SD) of respondents, was 52.8 (\pm 11.9) years while the minimum age and maximum age of the respondents were shown to be 19 years and 80 years respectively. Less than half, thus 17.1% were 40 years and below while, whereas the majority of the respondents were 41 year and above. The majority of the respondents fell within the 51-60 years age group (figure 4.1). Almost all of the respondents were married, they formed 70.7% of them while the remaining were either divorced/ separated (13.2%), widows/widowers (12.7%), or single which were the fewest among them (3.4%). Almost all of them had dependents, thus having either one or more dependents and they constituted 98.1% of the respondents as shown in the table below.

Table 1: Demographic Characteristics of Respondents

Variables	Responses	Freq.	Percent (%)	Cum. Percent (%)
Mean (SD)		52.81(11.9)		
Gender	Female	115	56.1	56.1
	Male	90	43.9	100.0
	Total	205	100.0	
Marital Status	Single	7	3.4	3.4
	Married	145	70.7	74.1
	Divorce/Separation	27	13.2	87.3
	Widow/widower	26	12.7	100.0
	Total	205	100.0	
How many dependents	0	4	2.0	2.0
	1	42	20.5	22.4
	2	65	31.7	54.1
	3 or more	94	45.9	100.0
	Total	205	100.0	

Source: Field Data 2021

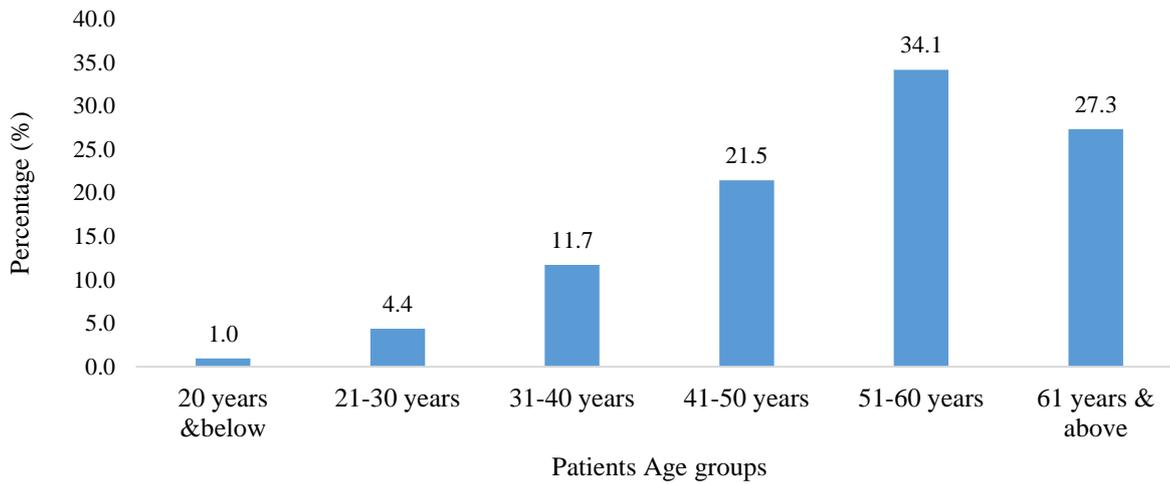


Figure 1: Age groups among diabetic patient respondents

Source: Field Data 2021

The majority of patients were primary or basic level literates forming 42.9% with quite a number of them (36.6%) having no education at all. Those who were secondary school graduates and above were a few, they formed 20.5% (table 4.2). The majority of them earned from GHc101.00 to GHc500.00 as their income (figure 4.2).

Table 2: Demographic Characteristics of Respondents Cont.

Variables	Responses	Freq. (n=205)	Percent (%)	Cum. Percent (%)
Education level	No education	75	36.6	36.6
	Primary/Basic	88	42.9	79.5
	SHS/SSS/ O'level	22	10.7	90.2
	Tertiary & Postgraduate	20	9.8	100.0
Religion	Christianity	167	81.5	81.5
	Islamic	34	16.6	98.0
	Other	4	2.0	100.0
What is your Employment Status	Employed/Self-Employed	108	52.7	52.7
	Unemployed	45	22.0	74.6
	Student	1	0.5	75.1
	Retired	51	24.9	100.0
Nationality	Ghanaian	205	100.0	100.0

Source: Field Data 2021

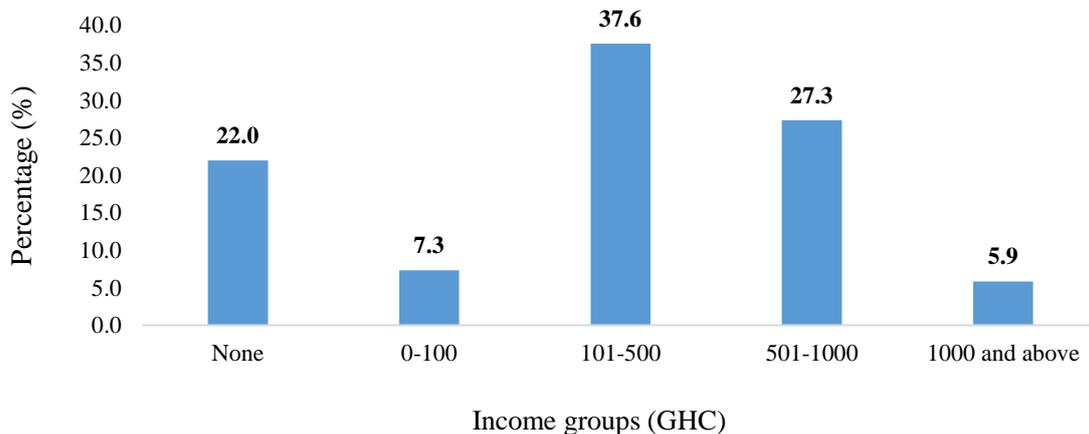


Figure 2: Income earnings among diabetic patient respondents

Diabetic Condition Characteristics of Respondents

Table two (2) presents the summary of the diabetic characteristics of the patients. The type of diabetes with high prevalence among them was “type 1 diabetes” (118, 57.6%), and the second highest was “type 2 diabetes” (80, 39.0%). Almost all of them mentioned they had not taken alcohol prior to getting the diabetes condition (93.2%). The minimum duration of their diabetes condition span from One (1) month to One hundred and twenty (120) months, thus ten (10) years. Almost all of them had been with the condition for a space of one (1) year (91.2%).

Table 3: Diabetic Condition Characteristics of Respondents

Variable	Responses	Freq.	Percent (%)	Cum. Percent (%)
What is your type of diabetes?	Type 1 Diabetes	118	57.6	57.6
	Type 2 Diabetes	80	39.0	96.6
	Gestational Diabetes	6	2.9	99.5
	Don't know	1	0.5	100.0
	Total	205	100.0	
Did you regularly in alcohol BEFORE getting this condition?	Yes Regularly	4	2.0	2.0
	Yes Sometimes	9	4.4	6.3
	No	191	93.2	99.5
	Don't know/Not sure	1	0.5	100.0
	Total	205	100.0	
Duration of condition	Median (IQR)	6 (5-8) months		
Duration groups	1-5 months	80	39.0	39.0
	6-12 months	107	52.2	91.2
	13 months & above	18	8.8	100.0
	Total	205	100.0	

Source: Field Data 2021

Family History of Diabetic Patients

Figure 3 below presents the history of disease conditions among the family of respondents. The majority of the patients indicated that there was a family history of diabetes in the family (79%) and few claimed that there was Hypertension in the family (3%). Some claimed there was no such disease traced in the family (16%).

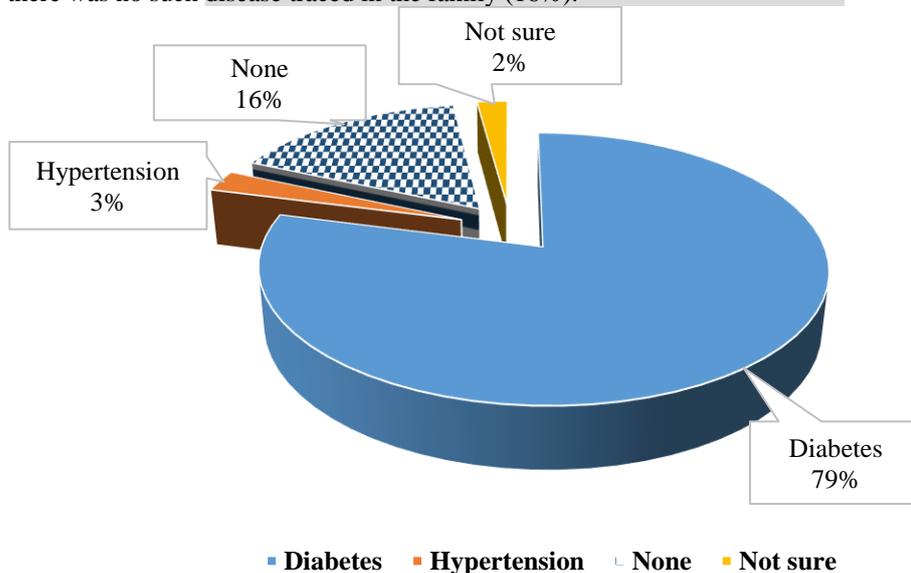


Figure 3: Family history of Diabetic Patients

Source: Field Data 2021

Medication Adherence characteristics

The table beneath presents the responses when the Morisky scale (questionnaire) was administered. A few of them relatively constituting 40.6% forgets to take their medication. They claim they hardly cut back or stop taking on their medication without telling their doctor 94.0%. More than half of them answered they take their medication most times or always, they formed 89.4% of the respondents.

Table 4: Medication Adherence characteristics

Variables	Responses	Freq. (n=202)	Percent (%)	Cum.Percent (%)
Do you sometimes forget to take your medication?	No	82	40.6	40.6
	Yes	120	59.4	100.0
For any reason, have you ever cut back or stopped taking your medications without telling your doctor?	No	189	94.0	94.0
	Yes	12	6.0	100.0
Do you take along your medication when traveling?	Yes	170	83.7	83.7
	No	19	9.4	93.1
	Haven't travelled yet	14	6.9	100.0
Do you take your medications?	No	3	1.5	1.5
	Yes	199	98.5	100.0
How often do you take your medication?	Once a while	8	4.2	4.2
	Sometimes	12	6.3	10.6
	Most times	72	38.1	48.7
	Always	97	51.3	100.0
Do you feel hassled about taking or sticking always to your medications plan?	No	179	89.5	89.5
	Yes	21	10.5	100.0

Source: Field Data 2021

Medication Adherence Scores

The table below presents the scores of respondents from the Morisky scale. The majority of the respondents scored 5Marks over a total of 6marks. They formed 52.7%. Further, those who scored all the 6marks were 26.3%. The adherence to medication is considered as those who scored from 5marks and above, therefore their medication adherence was 79.0%. In figure 4.5, the majority of the respondents were situated from the 4th mark and above with only a few on the left.

Table 5: Medication Adherence Scores

Variables	Responses	Freq.	Percent (%)	Cum.Percent (%)
Adherence	2	2	1.0	1.0
Scores	3	3	1.5	2.4
	4	38	18.5	21.0
	5	108	52.7	73.7
	6	54	26.3	100.0
Total		205	100.0	

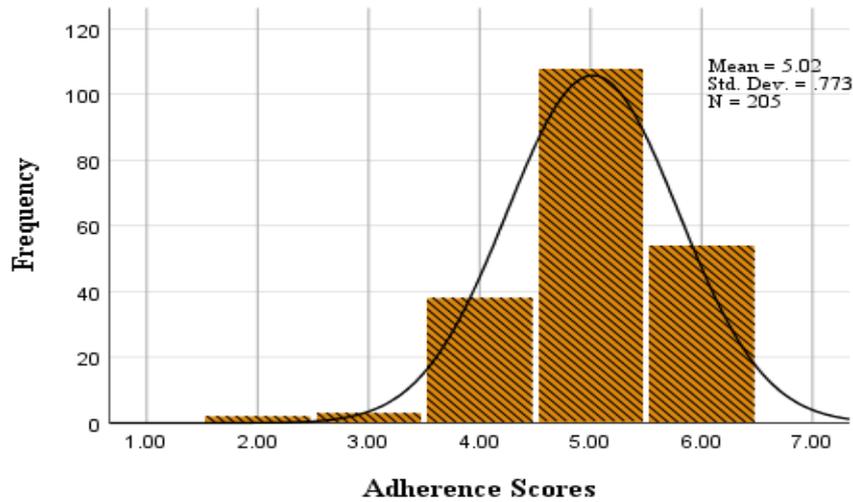


Figure 4: Medication Adherence distribution of Scores

Correlation between demographic factors and medication adherence scores

Table 6 below presents the correlation between adherence scores and the demographic factors using the Pearson correlation matrix which requires that variables are continuous only. The results showed that the correlation between Age and Adherence is ($r=-0.16$, $p<.05$), Number of dependents (dependents), and adherence ($r= -0.19$, $p<.05$) were statistically significant but negatively weak correlations. The results showed that As Age increased adherence decreased and as the number of dependents increased adherence decreased.

Table 6: Correlation scores of demographic factors and medication adherence

		1	2	3
Correlations				
Age (1)	P. Correlation	1		
	Sig. (2-tailed)			
	N	205		
Adherence Scores (2)	P. Correlation	-0.16*	1	
	Sig. (2-tailed)	0.02		
	N	205	205	
Dependents (3)	P. Correlation	0.672**	-0.196**	1
	Sig. (2-tailed)	0.00	0.005	
	N	205	205	205

*. Correlation is significant 0.05, **. Correlation is significant at the 0.01 level (2-tailed).

Associations scores of categorical demographic factors and medication adherence

The relationship assessment was done using the Eta coefficient test which allows one to find the correlation between a continuous scale (adherence) and a categorical variable (gender, marital status, income earnings, religion, and employment status). The results showed that all the correlations between adherence gender, marital status, income earnings, religion, and employment status were weak positive correlations and explain very little variations (Eta-Square) as indicated in table 7 below.

Table 7: Associations between demographic factors and medication adherence scores

	Adherence Scores	
	Eta Correlation	Eta-Square
2. Your Gender (n= 205)	0.086	0.74%
3. Marital Status (n= 205)	0.174	3.04%
4. Education level (n= 205)	0.140	1.96%
7. Income earnings (n= 205)	0.247	6.08%
6. Employment Status (n= 205)	0.030	0.09%
5. Religion (n= 205)	0.134	1.79%

Factors influencing antidiabetic medication adherence

The model explained 10.1% ($R^2 = 0.101$) of the variance in the anti-diabetes medication adherence. The results from the regression indicated that the model was a significant predictor of anti-diabetic medication adherence $F(4,179) = 5.04$, $p = .001$ whereas the number of dependents contributed significantly to the model ($B = -0.22$, $p < .05$), education level also contributed significantly to the model ($B = 0.14$, $p < .05$), Income contributed significantly to the model ($B = 0.11$, $p < .05$) and lastly employment which was also significant ($B = .03$, $p < .05$). Adherence = $4.85 + (0.14 * \text{level of Education}) + (0.11 * \text{Income}) + (0.03 * \text{Employment Status}) + (-0.22 * \text{Dependents})$ as shown in table 8 below.

Table 8 Factors influencing antidiabetic medication adherence

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	4.85	0.28		17.44	0.000
Dependents	-0.22	0.08	-0.22	-2.85	0.005
Education level	0.14	0.07	0.17	2.09	0.038
Income	0.11	0.06	0.16	1.98	0.049
Employment Status	0.03	0.06	0.05	0.55	0.583

B=Coefficients, Sig= Significance

Discussion:

The study findings showed that the prevalence or level of adherence to medication among diabetic patients was 79.0%. The level identified is high enough compared to a similar study done in Ethiopia which claimed high rates of medication adherence pegged at 74.9% [7] and also in Nepal (97.3%) [8]. A similar result was also identified in Sudan where patients with type 2 diabetes had a 62.7% medication adherence [9]. The reason for seeing high prevalence in this center may be due to the characteristics and role of health providers in the center. The center has nutritionists, dieticians, and public health nurses (aside from the medical doctors and nurses who see the patients) who give daily general education to all patients and open sessions for counseling after doctor consultation. This may be true since the World Health Organization (WHO) laments that antidiabetic medication non-adherence is a major public health concern and results in complications and hospitalization. They also term the rise in nonadherence as an

invisible epidemic” [10]. A study done in the United States of America found that diabetic patients who did not adhere to medication relatively had significantly worse clinical outcomes than diabetic patients who adhered to medications [11]. The American pharmaceutical association concluded that to achieve medication adherence there is a need to persistently engage patients and the healthcare team. According to [12] prioritizing education and counseling will lead to a reduction in the rate of medication non-adherence in patients [13] our aim in correcting this problem should be the position of The American pharmaceutical association indicates that to achieve medication adherence one requires persistent engagement with both patients and the healthcare team as well as prioritize patient education (Ross (2014). The results showed that all the correlations between Age and Adherence ($r=-0.16$, $p<.05$), Number of dependents (dependents), and adherence ($r= -0.19$, $p<.05$) were statistically significant and had negatively weak correlations and correlations between adherence and gender, marital status, income earnings, religion, and employment status were weak positive correlations and explain very little variations (Eta-Square). In comparison to other studies conducted in Ghana there was a significant association between the level of adherence and educational level [(OR)=1.508; (CI 0.805-2.825), $P=0.019$), and mode of payment [(OR)=1.631; (CI 0.997-2.669), $P=0.05$] [14]. The results also showed that the number of dependents contributed significantly to the model ($B= -0.22$, $p<.05$), education level also contributed significantly to the model ($B=0.14$, $p<.05$), Income contributed significantly to the model ($B=0.11$, $p<.05$) and lastly employment which was also significant ($B=.03$, $p<.05$). The results proved that a unit increase in education raises medication adherence by 0.14 this is contrary with a study done that concluded that poor adherence to treatment reduced as knowledge (informed by education) about diabetes increased. These findings were consistent with systematic reviews which suggest that a higher level of education as well employed seems to have a positive impact on medication adherence [15]. It is also noted in this study that unemployment (implying low-income earnings) and the cost of medications showed a negative effect on adherence.

Limitations: Some patients could not be captured due to time constraints on their part.

Conclusion

The level of medication adherence among the diabetic patients was 79.0%. The number of dependents and educational levels contributed significantly to the model ($B=-0.22$, $p<.05$), and ($B=0.14$, $p<.05$). Income and employment both also affected the model significantly ($B=0.11$, $p<.05$) and ($B=.03$, $p<.05$).

Recommendation

1. Health professionals should spend enough contact time on patient education about their disease conditions and provide patients with electronic reminders for medications, hospital visits, and regimen simplification.
2. There should be Effective Partnership between patients and healthcare providers to create an enabling atmosphere for cohesive adherence counseling and assimilation.
3. There is a need for a strong community understanding and social support to ensure that better health outcomes and improved Quality of Life (QoL) are achieved.

Conflict of interest: The team has no conflict of interest to declare.

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